

SYSTEM AND METHOD FOR GESTURE-BASED POINT OF INTEREST SEARCH

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is a continuation of U.S. application Ser. No. 14/333,369, filed Jul. 16, 2014, which itself is a continuation of U.S. application Ser. No. 13/835,252, filed Mar. 15, 2013 and issued as U.S. Pat. No. 8,818,716, both of which are incorporated by reference in their entireties. This application is also related to U.S. application Ser. No. 13/228,395, entitled “Vehicle User Interface System,” which is incorporated by reference herein in its entirety.

BACKGROUND

[0002] 1. Field of the Invention

[0003] The present invention relates generally to gesture recognition and in particular to searching for a point of interest based on a gesture.

[0004] 2. Description of the Related Arts

[0005] Vehicle technologies and features available to and controlled by a driver have advanced in recent years. For example, many vehicles feature integrated computing systems with network connections that can be used to retrieve and display a wide range of information. One key function of vehicle-based computing systems is the ability to retrieve information related to points of interest (POI) near the vehicle. This can be useful, for example, when the driver wishes to identify a nearby building or view information (e.g., ratings and reviews) for a restaurant or store.

[0006] A driver typically interacts with a vehicle-based computing system by inputting commands via a touchscreen or physical buttons on the center console of the vehicle. However, using a touchscreen or buttons to request POI information by navigating a map or typing in a search term can be cumbersome and frustrating, especially when the driver is requesting information about a POI that he can see through the vehicle's windows.

SUMMARY

[0007] A computing system retrieves information associated with a point of interest based on an identifying gesture that a user performs inside a vehicle. The identifying gesture is oriented so that it identifies an object outside the vehicle. The computing system receives a data signal representing the identifying gesture and performs gesture recognition on the data signal to determine a direction vector corresponding to the direction of the identifying gesture. The system also accesses location data to identify the vehicle's current location and orientation. The direction vector, location, and orientation are then analyzed to generate a target region that corresponds to the object that was identified by the gesture, and the system retrieves information associated with one or more POIs in the target region. The retrieved information is provided to the user via an output device, such as a speaker or display.

[0008] The features and advantages described in the specification are not all inclusive and, in particular, many additional features and advantages will be apparent to one of ordinary skill in the art in view of the drawings, specification, and claims. Moreover, it should be noted that the language used in the specification has been principally

selected for readability and instructional purposes, and may not have been selected to delineate or circumscribe the inventive subject matter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The teachings of the embodiments of the present invention can be readily understood by considering the following detailed description in conjunction with the accompanying drawings.

[0010] Figure (FIG.) **1** illustrates an exemplary operating environment **100** for various embodiments of the gesture-based POI search system.

[0011] FIG. **2** is a high-level block diagram illustrating components of the POI information retrieval module of FIG. **1**, according to one embodiment.

[0012] FIG. **3** is a flow chart illustrating a process for retrieving information about a POI based on an identifying gesture, according to one embodiment.

[0013] FIG. **4A-4D** illustrate an example of a gesture-based POI search.

[0014] FIG. **5** is a flow chart illustrating a process for maintaining micromaps in the gesture-based POI search system, according to one embodiment.

DETAILED DESCRIPTION OF EMBODIMENTS

[0015] Embodiments are now described with reference to the accompanying figures. Like reference numbers indicate identical or functionally similar elements. Also in the figures, the left most digit of each reference number corresponds to the figure in which the reference number is first used.

Overview

[0016] A POI information retrieval module allows a user, such as the driver of a vehicle, to retrieve information related to a point of interest near the vehicle by pointing at the POI or performing some other gesture to identify the POI. A camera system in the vehicle captures the gesture and sends a data signal representing the gesture to the POI information retrieval module. The POI information retrieval module performs gesture recognition on the data signal to generate a target region that includes the POI that the user identified. After generating the target region, information about the POI can be retrieved by querying a server-based POI service with the target region or by searching in a micromap that is stored locally. The retrieved POI information can then be provided to the user via a display and/or speaker in the vehicle. This process beneficially allows a user to rapidly identify and retrieve information about a POI near the vehicle without having to navigate a user interface by manipulating a touchscreen or physical buttons.

[0017] The user may optionally issue a voice command along with a gesture. If a microphone in the vehicle detects a voice command, the POI information retrieval module performs voice recognition on the voice command to generate a character string representing the words that were spoken as part of the command. The character string can then be used to help identify the POI that the user pointed at. For example, if the user says “building” while pointing at a building, the POI information retrieval module can ignore information for non-building objects (e.g., playgrounds, parking lots, etc.) when retrieving information for POIs in the target region.